

WHAT IS CLAIMED IS:

1. A cushion apparatus for recovery from fatigue, comprising:

5 a controller for controlling the entire operation of the apparatus;

an alarm unit for outputting an alarm through a speaker in response to a signal output from the microprocessor of the controller at a preset time, and counting the preset time and  
10 outputting a signal indicating the coming of the preset time to the microprocessor of the controller to output a vibration control signal to the vibration drive means of the controller and thus alarm a user;

transmission units for transmitting a high frequency  
15 transmission signal through antennas when it is detected that a door is opened or an unfamiliar person trespasses;

a reception unit for receiving the high frequency transmission signal from the transmission units and outputting the high frequency signal to the controller;

20 input means for allowing a user command to be input to the controller;

a plurality of vibration units arranged at regular intervals to apply vibration to a human body when the reception unit receives the high frequency transmission signal  
25 from the transmission units, the user command is input from

the input means, and the time set by the alarm unit has elapsed;

a cylindrical cushion body composed of semi-cylindrical upper and lower cushion bodies, the upper and lower cushion parts being each provided with a plurality of containing depressions arranged along the center line of the flat surface thereof at regular intervals to accommodating the vibration units, a plurality of cutouts arranged between the containing depressions at regular intervals to reduce the weight thereof, and an holding recess formed at one end thereof;

an adaptor accommodated in the holding recess to receive Alternating Current (AC) power, convert the AC power into Direct Current (DC) power, and apply the DC power as operating power to the controller;

a heat plate for receiving the DC power from the adaptor and applying heat to the human body under the control of the controller;

display means for emitting light and indicating that the heating on/off switch and vibration on/off switch of the input means are turned on when the heating on/off switch and the vibration on/off switch are turned;

an inner cover for covering the heating plate fixedly mounted on the outer surface of the cylindrical cushion body;

an outer cover for covering the inner cover;

an aromatic pouch detachably attached to one of two

strings tying both openings of the outer cover;

a plurality of casings for accommodating the vibration units not only to prevent the breakage and malfunction of the vibration units during operation and improve the durability of  
5 the vibrations units; and

an anion emitting unit electrically connected to a jack provided in the input means to emit anions.

2. The cushion apparatus as set forth in claim 1, wherein  
10 the vibration units are first to third vibration motors arranged at regular intervals.

3. The cushion apparatus as set forth in claim 1, wherein the vibration units are a plurality of solenoids arranged at  
15 regular intervals.

4. The cushion apparatus as set forth in claim 1, wherein the controller comprises:

a microprocessor for controlling the entire operation of  
20 the apparatus;

a relay configured to be switched to repeat the cycle, in which DC power is supplied to the heating wire of the heating plate for 60 minutes and the supply of DC power to the heating wire is cut off for 1 minute, 10 times in response to a  
25 control signal output from the microprocessor when the heating

on/off switch of the input means is turned on;

a vibration drive unit for sequentially operating the vibration units under the control of the microprocessor to generate strong vibration when the reception unit receives a high frequency transmission signal from the transmission units, a user command is input from the input means or the time set by the alarm unit has elapsed, and both the vibration on/off switch of the input means and a strong vibration switch are turned on, and sequentially operating the vibration units under the control of the microprocessor to generate weak vibration when the reception unit receives a high frequency transmission signal from the transmission units, a user command is input from the input means or the time set by the alarm unit has elapsed, and both the vibration on/off switch of the input means and a weak vibration switch are turned on; and

an Electrically Erasable Programmable Read-Only Memory (EEPROM) for storing an execution program operating the microprocessor.

20

5. The cushion apparatus as set forth in claim 1, wherein the heating plate comprises:

a bonding agent layer applied to the cylindrical cushion body;

25 a heating wire placed on the bonding agent layer to

repeat a cycle, in which heat is emitted by the application of DC power for 1 hour and heat is not emitted for 1 minute, 10 times;

5 a bimetal connected in the heating wire to cut off the application of the DC power to the heating wire when a temperature at a location adjacent to the heating wire is higher than a predetermined temperature (for example, 60°C);

10 a temperature sensor located at the location adjacent to the heating wire to detect the temperature at the location and input information about the detected temperature to the microprocessor of the controller;

an insulation layer adapted to coat the heating wire, the bimetal and the temperature sensor; and

a cover configured to cover the insulation layer.

15

6. The cushion apparatus as set forth in claim 1, wherein the input means comprises:

20 a heating on/off switch for inputting a command to apply DC power to the heating wire of the heating plate to the microprocessor of the controller;

a vibration on/off switch for inputting a user vibration control command to sequentially operate the vibration motors for a predetermined time to the microprocessor of the controller;

25 a strong vibration switch for inputting a user strong

vibration control command to operate the vibration units to generate strong vibration;

a weak vibration switch for inputting a user weak vibration control command to operate the vibration units to generate weak vibration; and

a jack for electrically connecting with the anion emission unit.

7. The cushion apparatus as set forth in claim 1, wherein the alarm unit comprises:

alarm time setting means for setting the alarm time after which an alarm sounds;

alarm time display means for displaying the alarm time set by the alarm time setting means;

a timer for counting the set alarm time set by the alarm time setting means; and

an alarm on/off switch for controlling the output of the counted alarm time to the controller.

8. The cushion apparatus as set forth in claim 7, wherein the alarm time setting means comprises:

the alarm time setting switch for setting the alarm time after which a user is made to wake up;

a hour changing switch for changing hours to set the hours of the alarm time when the alarm time setting switch is

pressed;

a minute changing switch for changing minutes to set the minutes of the alarm time when the alarm time setting switch 411 is pressed;

5 a hour/minute decreasing switch for decreasing the hours and minutes of the set alarm time when the alarm time set by the alarm time setting switch;

the hour changing switch and the minute changing switch is set to be later than a desired alarm time;

10 a hour/minute increasing switch for increasing the hours and minutes of the set alarm time when the set time changed by the minute/hour decreasing switch is excessively decreased; and

a reset switch for resetting the alarm time set by the  
15 alarm time setting switch, the hour changing switch and the minute changing switch at the time of power failure.

9. The cushion apparatus as set forth in claim 7, wherein the transmission unit comprises:

20 a transmission controller for controlling a transmission operation;

a proximity switch for detecting magnetic force lines output from the permanent magnet mounted on a door frame and outputting a detection signal to the transmission controller;

25 modulation means for receiving a transmission control

signal from the transmission controller and modulating the transmission control signal by combining the transmission control signal with a signal generated by an oscillator into a carrier when the proximity switch does not detect the magnetic  
5 force lines output from the permanent magnet;

Radio Frequency (RF) amplification means for amplifying the carrier output from the amplification means into a radio frequency signal;

a low-pass filter for filtering out a low-pass component  
10 from the radio frequency signal into which the carrier is amplified by the RF amplification means;

a transmission antenna for transmitting the radio frequency signal from which the low-pass component is filtered out, a battery for supplying operating power to the  
15 transmission controller when the switch is turned on; and

a LED for indicating that the transmission controller is operated.

10. The cushion apparatus as set forth in claim 1,  
20 wherein the transmission unit comprises:

a transmission controller for controlling a transmission operation;

infrared ray detection means for detecting an infrared signal emitted from a human body;

25 a noise filter for receiving the infrared signal detected



by the infrared detection means and filtering out noise from the infrared signal;

amplification means for receiving the infrared signal from which the noise is filtered out by the noise filter, 5 amplifying a noise-free infrared signal to a certain level, and outputting an amplified signal to the transmission controller;

modulation means for receiving a transmission control signal from the transmission controller and modulating the 10 transmission control signal by combining the transmission control signal with a signal generated by an oscillator into a carrier;

RF amplification means for amplifying the carrier output from the amplification means into a radio frequency signal;

15 a low-pass filter for filtering out a low-pass component from the radio frequency signal into which the carrier is amplified by the RF amplification means;

a transmission antenna for transmitting the radio frequency signal from which the low-pass component is filtered 20 out;

a battery for supplying operating power to the transmission controller when the switch is turned on; and

a LED for indicating that the transmission controller is operated.

25

11. The cushion apparatus as set forth in claim 1,  
wherein the reception unit comprises:

a reception antenna composed of a resonant coil wound on  
a ferrite core and a resonant condenser connected in parallel  
5 to the resonant coil to receive the radio signal transmitted  
from the antennas and extract a resonant frequency signal from  
the radio signal;

amplification means for amplifying the resonant frequency  
signal extracted by the reception antenna to a certain level;

10 a coupling condenser for blocking the DC component signal  
of the resonant frequency signal and outputting only the AC  
component signal of the resonant frequency signal;

an RF reception module for amplifying the AC radio  
frequency signal output from the coupling condenser to a  
15 certain level, performing filtering and detection and the AC  
radio frequency signal into a digital radio frequency signal;  
and

a switch for controlling the output of the digital radio  
frequency signal to the microprocessor of the controller.

20

12. The cushion apparatus as set forth in claim 11,  
wherein the RF reception means comprises:

first amplification means for filtering out a DC  
component signal included in the radio frequency signal  
25 received by the reception antenna using the coupling

condenser, amplifying an AC component signal to a certain level, and outputting only the AC component signal through accurate tuning to a reception frequency;

filter/detection means for filtering out noise included  
5 in the AC component signal that is amplified into the certain level by the first amplification means, and detecting and outputting a noise-free AC component signal;

an RC filter composed of a resistor and a capacitor to filter out noise included in a detection signal output from  
10 the filter/detection means; and

an A/D converter for converting a noise-free detection signal into a digital signal.

13. The cushion apparatus as set forth in claim 12,  
15 wherein the first amplification means comprises:

a transistor for blocking the DC component signal included in the radio frequency signal received by the reception antenna using the coupling condenser, receiving only the AC component signal and amplifying the AC component signal  
20 to a certain level;

a tank circuit composed of a capacitor and a coil wound on a ferrite core to receive the reception signal amplified by the transistor and be accurately tuned to the reception frequency; and

25 a coupling condenser for blocking the AC component signal

included in the reception signal output from the tank circuit and outputting only the AC component signal to the filter/detection means.